

Orographic Rainfall in the Appalachian Region of the Mississippi River Basin

James A. Smith, Principal Investigator

**Department of Civil Engineering and Operations Research
Princeton University**

SUMMARY

Orographic precipitation processes play a major role in the water resources and weather hazards of the world, yet they are among the most poorly understood elements of hydrometeorology (Houze [1993]). Orographic rainfall will be examined in this project for the Appalachian portion of the GCIP Large Scale Area (LSA) East. Three special study regions will be utilized, one each from the southern, central and north-central Appalachian region. Each of the study regions represents the area of coverage of two overlapping WSR-88D (Weather Surveillance Radar - 1988 Doppler) sites. The site pairs are: 1) Knoxville TN and Greer SC, 2) Charleston WV and Roanoke VA, and 3) Pittsburgh PA and State College PA (see figure 1). For each of the pairs, one site covers the western Appalachian region while the other provides intermountain coverage. The hydroclimatology of rainfall in the Appalachian region of the Mississippi River basin will be examined in this study through analyses of a 4-year record of WSR-88D rainfall products and high-elevation rain gage data. Analyses will be carried out to characterize the geographic, diurnal, seasonal and interannual variability of precipitation for the Appalachian study region. The hydrometeorology of orographic rainfall will be examined through detailed analyses of selected precipitation events. These analyses, which will utilize volume scan WSR-88D reflectivity and Doppler velocity data, GOES-8 imagery (IR, visible and water vapor), and conventional meteorological data, will provide insight into the orographic precipitation mechanisms that are responsible for the hydroclimatology of the Appalachian region.

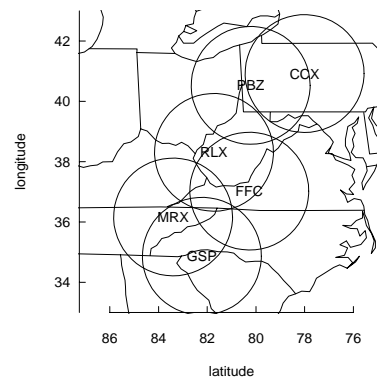


Figure 1: Overlapping coverage areas of WSR-88D radars in the Appalachian region.